JAAN ALTOSAAR

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BORN: March 8, 1992 — Ottawa, Canada
LANGUAGES: English (native), Estonian (native), French (fluent), Spanish (working)

AREAS OF SPECIALIZATION

Machine Learning • Theoretical Physics • Biophysics • Deep Learning • Time series models

EDUCATION

2013-
Ph.D., Physics. Advisors: David Blei and Shivaji Sondhi.
Princeton University, Princeton, New Jersey, United States of America

2009-2013
B.Sc. First Class Honours in Mathematics and Physics
McGill University, Montreal, Quebec, Canada
Top 10% cumulative GPA, Dean's Honour List, Dean's Multidisciplinary Undergraduate Research List

2007-2009
Ontario Secondary School Diploma
Hillcrest High School, Ottawa, Ontario, Canada. Honours, Co-President of 1200-student body

2006-2007
Higher School Certificate Years 9 & 10
Randwick Boys High School, Sydney, New South Wales, Australia

HONORS, AWARDS, & FELLOWSHIPS

2014   Google Summer of Code: Topic modeling LaTeX on the arXiv (Princeton, $6,000)
2014-2017   NSERC Doctoral Postgraduate Scholarship: ranked 3rd of 204 (Princeton, $63,000)
2013   Julie Payette NSERC Research Scholarship: awarded to the top 24 applicants in the Canada-wide Postgraduate Scholarships M competition (Ottawa, $25,000)
2013-2016   Commonwealth Scholarship, DPhil studies at University of Oxford (*Declined*, £31,875/year)
2013   The Faculty of Science Moyse Travelling Scholarship, McGill University (Montreal, $8,800)
2013   Delta Upsilon Graduate Scholarship, McGill University (Montreal, $5,000)
2013   Travel award, KAUST WEP Conference (Jeddah, $2000)
2012   First Prize for best poster, Canadian Undergraduate Physics Conference (Vancouver)
2012   Elected to Sigma Xi Society (Montreal)
2012   Second Prize, McGill Faculty-wide Undergraduate Research Conference (Montreal, $150)
2012   Third Prize, McGill Department of Physics Poster Conference (Montreal)
2012   NSERC Undergraduate Student Research Award (Waterloo, $8,400)
2011   McGill Award for Canadian Undergraduate Physics Conference (Saskatoon, $1,000)
2011   NSERC Undergraduate Student Research Award (Montreal, $7,600)
2010   Estonian Foundation of Canada Scholarship (Toronto, $2,000)
2010   NSERC Undergraduate Student Research Award (Montreal, $5,500)
2009   Annette S. Hill McGill Scholarship and Bursary (Montreal, $5,000)
2008   Harry Elton Memorial Award (Shanghai, China, $2,000)

WORK EXPERIENCE

5/2016-9/2016   **Research Intern, Google Brain** (Mountain View, CA). Host: Eugene Brevdo
Research internship; variational inference in TensorFlow.

5/2015-9/2015   **Research Intern, Google DeepMind** (London, UK). Host: Andriy Mnih
Research internship, Deep Learning group.

11/2013-   **Founder, Useful Science** (http://usefulscience.org)
Led team of 65 through launch of a non-profit science website (700k+ hits, 15k+ subscribers).
Partnered with Fitbit, "won $50,000" on Dragons' Den.

5/2013-8/2013   **UI and UX Designer, Ottawa Hospital Research Institute**
Led UI design and testing; completed the design of Canada's vaccinations mobile app used to submit vaccination profiles to the government. My designs are still in use: demo (140k+ users).

RESEARCH EXPERIENCE

4/2014-   Advisors: David Blei & Shivaji Sondhi
Columbia University, *Departments of Computer Science and Statistics*
Princeton University, *Department of Physics*
Combining Bayesian inference with deep learning to model LaTeX equations and other time series; recommendation systems.

9/2013-4/2014   Advisor: Iain Couzin
Princeton University, *Departments of Physics, Ecology and Evolutionary Biology*
Applied machine learning techniques to study rainforest health via audio recordings. Completed 3-week field study in Costa Rica to collect rainforest audio.

9/2012-7/2013   Advisors: Jürgen Sygusch & Anmar Khadra
Université de Montréal, *Department of Biochemistry*
McGill University, *Department of Mathematics and Statistics*
Theoretical biophysics: analysis and testing of the Resonant Recognition Model as a potential theory of biomolecular recognition.

5/2012-8/2012   Advisor: Michel Gingras
University of Waterloo, *Department of Physics and Astronomy*
Condensed matter theory: studies of the generalized dipolar spin ice model of dysprosium titanate via cumulant expansion methods implemented within Monte Carlo simulations.

5/2011-4/2012   Advisors: Walter Reisner & Moshe Szyf
McGill University, *Department of Physics; Department of Pharmacology & Therapeutics*
Biophysics: single-molecule DNA methylation mapping in nanochannels. Experienced with Matlab, protein purification and binding assays, and TIRF microscopy.

5/2010-8/2010   Advisor: Jürgen Sygusch
Université de Montréal, *Department of Biochemistry*
Bioinformatics: computational high throughput screening of potential *Magnaporthe* pesticides.

RESEARCH ADVISING

Spring 2016	Eamonn Bell (Ph.D. '18, Columbia University)
Fall 2014	Ethan Benjamin (M.Sc. '14, Columbia University)
Fall 2014	Jingwei Zhang (M.Sc. '14, Columbia)
Fall 2014	Andrew James Mercer-Taylor (B.Sc. '15, Columbia University)
Fall 2014	Anjishnu Kumar (M.Sc. '14, Columbia University)
Fall 2014	Tony Paek (M.Sc. '15, Columbia University)
Fall 2014	Drishan Arora (M.Sc. '14, Columbia University)

TEACHING EXPERIENCE

Spring 2014	**Instructor, Princeton Splash.** Four lectures to local high school students.
Winter 2013	**Teaching Assistant, McGill University.** Applied Linear Algebra (Prof. Adam Oberman)
Winter 2012	**Teaching Assistant, McGill University.** Honours Complex Variables (Prof. Robert Seiringer)
Fall 2011	**Teacher, Montreal Estonian Society Kindergarten**
Fall 2011	**Mentor, McGill University Buddy Program**

INVITED TALKS

2017	Proximity Variational Inference. *Bloomberg L.P. Machine Learning Group*
2017	food2vec. *Northeastern University, Albert-László Barabási group*
2017	food2vec. *New York Times, Machine Learning & Cooking editorial teams*
2016	Machine learning seminar: Operator Variational Inference. *Imperial College, London*
2016	Machine Intelligence Research Institute Colloquium Series on Robust and Beneficial AI
2015	Dragons' Den demo day, *Canadian Broadcasting Corporation*
2013	Montreal Startup Club presentation on the Immunize Canada app, *Rho Canada Ventures*
2012	Department of Physics Undergraduate Student Symposium, *McGill University*
2012	Canadian Undergraduate Physics Conference, *University of British Columbia*

PUBLICATIONS

2016	J. Altosaar, R. Ranganath, and D. Blei. Proximity Variational Inference. *Approximate Inference Workshop, NIPS 2016.*
2016	R. Ranganath, D. Tran, J. Altosaar, and D. Blei. Operator Variational Inference. *NIPS 2016.*
2016	D. Liang, J. Altosaar, L. Charlin, and D. Blei. Factorization meets the item embedding. *Submitted to Recsys 2016.*
2016	E. Bell, and J. Altosaar. Word embedding models applied to classical music recover the circle of fifths in embedding space. *ICML Music Discovery Workshop.*
2015	J. Zhang, A. Gerow, J. Altosaar, R. J. So, and J. A. Evans. Discovering Topic Correlation Across Arbitrary Collections. *Empirical Methods on Natural Language Processing.*
2015	P. Henelius, T. Lin, M. Enjalran, Z. Hao, J. Altosaar, P. Henelius, F. Flicker, T. Yavors'kii, and M. J. P. Gingras. Refrustration and Competing Orders in a Spin Ice Material. *Phys. Rev. B.* ● Featured on Phys. Rev. B. front page.
2015	A. J. Mercer-Taylor, and J. Altosaar. Sonification of fish movement using pitch mesh pairs. *NIME 2015.*
2015	E. Benjamin, and J. Altosaar. MusicMapper: Interactive 2D representations of music samples for in-browser remixing and exploration. *NIME 2015.* ● Featured and interviewed on The Wire magazine.
2012	J. Altosaar. Detecting methylation of single molecules of DNA. *McGill Honours Thesis.*

SELECTED POSTERS

2017	New York Academy of Sciences, Proximity Variational Inference
2016	NIPS, Operator Variational Inference
2016	NIPS Approximate Inference Workshop, Proximity Variational Inference
2016	ICML Music Discovery Workshop
2016	Rec'Sys, Factorization Meets the Item Embedding
2014	ComSciCon: Communicating Science, *Harvard University: ranked top 50 of 870 applicants*
2012	[2]Canadian Undergraduate Physics Conference, *University of British Columbia* *First Prize for best poster*
2012	[2]Faculty of Science Undergraduate Research Conference, *McGill University* *Second Prize: induction to Sigma Xi Society*
2012	[2]Department of Physics Poster Conference, *McGill University* *Third Prize: nomination and award for Canadian Undergraduate Physics Conference*
2011	[1]Department of Physics Poster Conference, *McGill University – Honourable Mention* [2]*Poster: How stuffing leads to novel behaviour in spin ice* [1]*Poster: DNA methylation mapping in nanochannels*

SCIENCE OUTREACH

2014	Hopewell Elementary School science fair judge
2014	Princeton Physics Open House Committee

PROFESSIONAL ASSOCIATIONS

Reviewer for: NIPS, ICML, PLOS ONE, Consciousness and Cognition
Member: Association for Computing Machinery, Institute of Physics, Sigma Xi Scientific Society (nominated), American Association for the Advancement of Science (nominated), Institute of Mathematical Statistics

ACTIVITIES & INTERESTS

1996-	Classical and jazz piano, electronic music production
2014-2015	Resident Graduate Student, Wilson College, Princeton University
2012	University of Waterloo Choir (Director: Professor Gerard Yun)
2011	Milton Park Recreation Association Beach Volleyball

SELECTED PRESS

2016	Editorial, The Conversation, "Accurate science or accessible science in the media – why not both?"
2016	Interview, The Wire magazine
2016	MusicMappr featured on Prosthetic Knowledge blog
2015	Featured on Dragons' Den
2015	In Training, "Medical Student Startup Improves Science Communication"
2014	Reddit front page
2014	Boing Boing, "Useful Science, accessible by all"
2014	Lifehacker, "Excel shortcuts, article summaries, and web notes"
2014	Fitbit corporate blog, "7 science-backed numbers to improve your life"
2014	New Zealand Herald, "10 top sites to visit this weekend"
2014	AweSci, "A chat with Jaan Altosaar from Useful Science"
2014	IT World, "Useful Science headlines that apply to your weird little computer life"

2014   McGill Tribune, "Useful Science bridges communication gap in research"
2014   McGill News, Alumni Magazine, "Better living through science"
2014   Betakit, "McGill grad launches curated list of science articles"
2014   CBC Radio, Spark episode on Sciencescape